

THE IMPACT OF FRAILTY IN THE OUTCOMES OF HIP FRACTURE SURGERY IN THE ELDERLY PATIENTS

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ABSTRACT

Osteoporotic hip fracture is as common health issue in an elderly population. With ageing, frailty comes into play as a complex geriatric syndrome. Studies have shown that frailty has negative consequences in the outcomes of health related interventions. Studies have indicated that the outcomes of any form of medical or surgical interventions are relatively poorer for the frail individuals in comparison to their pre-frail counterparts. 100 older patients of age 60 or more were with hip fracture undergoing hip fracture surgery were included in the study. FRAIL scale was used for the diagnosis of frailty in those patients. Preoperative complications like delirium were not significantly different among the frail and the pre-frail patients. Pre-frail patients could be ambulated early in comparison to their frail counterparts. The incidence of bedsores, postural hypotension and hospital acquired pneumonia was not significantly different among the frail and the pre-frail patients. But complications like urinary tract infection, deep vein thrombosis and pulmonary embolism were significantly higher among the frail patients. Similarly, hospital stay was longer in the frail group in comparison to the pre-frail ones. A significantly higher number of frail patients died within their hospital stay. In addition to that, mortality at 30th day was significantly higher in the frail group. The overall outcomes of hip fracture surgery were significantly poorer in the frail group in comparison to the pre-frail ones

KEYWORDS: Osteoporosis, Frailty, FRAIL Scale, Pre-Frail, Frail & Hip Fracture

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INTRODUCTION

Ageing is an important risk factor for osteoporosis. Osteoporotic hip fracture is a common health issue in an elderly population. With ageing, frailty comes into play as a complex geriatric syndrome. Frailer individuals are more prone to develop osteoporosis and subsequent osteoporotic fractures.⁽¹⁾ Frailty has many health related implications. Frailty is also associated with many of the co-morbid conditions. Studies have shown that frailty has negative consequences in the outcomes of health related interventions. Frailty has been associated with functional impairment, hospitalizations, and mortality.⁽²⁾ Patients with hip fracture have a 25% reduction in life expectancy compared to their uninjured peers.⁽³⁾ Over half will have persistent disability a year after the fracture.⁽⁴⁾ Various validated tools have been used for the syndromic diagnosis of frailty. One of the commonly used index is the FRAIL index. The five components of the scale are (a) Fatigue (b) Resistance (c) Ambulation (d) Illness and (e) Loss of weight. Frail scale scores range from 0–5 (i.e., 1 point for each component; 0=best to 5=worst) and represent frail (3–5), pre-frail (1–2), and robust (0) health status.⁽⁵⁾ Studies have indicated that the outcomes of any

form of medical interventions are relatively poorer for the frail individuals in comparison to their pre-frail counterparts. ⁽⁶⁾

MATERIALS AND METHODS

100 older patients of age 60 or more were with hip fracture undergoing hip fracture surgery were included in the study between the period of January 2016 and December 2016. FRAIL scale was used for the diagnosis of frailty in those patients. Fatigue was measured by asking respondents how much time during the past 4 weeks they felt tired with responses of “all of the time” or “most of the time” scored 1 point. Resistance was assessed by asking participants if they had any difficulty walking up 10 steps alone without resting and without aids before fracture occurred and Ambulation by asking if they had any difficulty walking several hundred meters alone and without aids before the fracture; “yes” responses were each scored as 1 point. Illness was scored 1 for respondents who reported 5 or more illnesses out of 11 total illnesses. Loss of weight was scored 1 for respondents with a weight decline of 5% or greater within the past 12 months based on self-report. ⁽⁵⁾

The patients were observed for any preoperative, peri-operative or postoperative complications till 30 days after hip fracture surgery.

STATISTICAL ANALYSIS

Descriptive statistics, including mean and standard deviation (SD), were calculated for all of the continuous variables, while frequencies were generated for the discrete variables. SPSS Version 10.01 was used to analyze the data. The p-value required for statistical significance was 0.05 or less. A Chi-square test was used to assess the difference in outcomes of hip surgery between the frail and the pre-frail patients. The continuous variables in each group were compared using the Student t- test.

RESULTS

Baseline Characteristics

As shown in Table 1, using the FRAIL scale, 54 patients were diagnosed to be ‘frail’, 38 patients were ‘pre-frail’ and only 8 were ‘robust’. The mean age of the frail was 84.56 ± 4.5 years whereas it was 78.24 ± 3.6 years and 64.05 ± 4.8 years for the pre-frail and the robust patients. 81.4% of the frail, 55.2% of pre-frail and 12.5% of robust patients were respectively malnourished as per nutritional status assessed by Nestle mini-nutritional assessment with score <7 . ⁽⁷⁾ Multi morbidity (defined by the presence of more than 1 medical condition in a single individual) was present in all the frail patients, 94.7% of the pre-frail patients and only 62.5% of the robust patients.

92.5% of the frail patients were pre-morbidly very much dependent on their activities of daily living (ADL) which was assessed by the ‘Katz index of independence in activities of daily living’ ⁽⁸⁾. Only 68.4% of pre-frail patients and 25% of robust patients were very much dependent on ADL with Katz score less than 3. ‘Lawton and Brody Instrumental activities of Daily Living (IADL) scale’ ⁽⁹⁾ score was <4 in 96.2% of the frail patients. An assessment of risk of a fall by Morse full scale ⁽¹⁰⁾, 96.3% of the frail patients were pre-morbidly at high risk of falls, which was 68.4% of the pre-frail and 25.0% of the robust hip fracture patients.

Table 1: Baseline Characteristics of the Study Participants NMSE: Nepali Mental Status Examination; ADL= Activities of Daily Living, IADL: Instrumental Activities of Daily Living

S.N	Baseline characteristics	Frail (54)	Pre-frail (38)	Robust (8)
1.	Age	84.56±4.5	78.24±3.6	64.05± 4.8
2.	Gender (female)	34 (62.9)	19 (50.0)	2 (25.0)
3.	NMSE score (<10)	44 (81.4)	21 (55.2)	1 (12.5)
4.	ADL (Katz , <3)	50 (92.5)	26 (68.4)	2 (25.0)
5.	IADL (Lawton and Brody, <4)	52 (96.2)	32 (84.2)	3 (37.5)
6.	Morse fall scale			
	No risk (0-24)	0 (0.0)	2 (5.2)	4 (50.0)
	Low risk (25-50)	2 (3.7)	10 (26.3)	2 (25.0)
	High risk (>51)	52 (96.3)	26 (68.4)	2 (25.0)
7.	Body Mass Index (kg/m ² , <18.5)	50 (92.6)	25 (65.7)	3 (37.5)
8.	Mini-nutritional assessment (<7)	44 (81.4)	26 (68.4)	4 (50.0)
9.	Multi-morbidity (>1 morbidities)	54 (100)	36 (94.7)	5 (62.5)

Outcomes of Surgery

As shown in Table 2, when the outcomes of frail patients were compared with the pre-frail patients, it was found that peri-operative delirium was found in 88.8% of frail and 84.5% of pre-frail patients (P=0.068). Similarly, ambulation in 72 hours post-surgery was possible in only 5.5% of frail patients, whereas 26.3% of pre-frail patients were ambulated in 72 hours (P=0.001).

Bedsore (more than grade 2) developed in 39.8% of frail and 36.8% of pre-frail patients (P=0.081). Hospital acquired pneumonia was seen in 51.8% of frail and 50.0% of pre-frail patients (P=0.064). Similarly, urinary tract infection occurred in 70.3% of frail patients, whereas in 47.3% of the pre-frail patients (P=0.001). Deep vein thrombosis occurred in 51.8% of the frail whereas in 31.5% of the pre-frail patients (P=0.003). Similarly, life threatening pulmonary embolism occurred in 11.1% of frail and 5.26% of the pre-frail patients (P=0.021).

In-hospital mortality occurred in 40.7% of the frail and 31.5% of the pre-frail patients (P=0.021). Hospital stay was more than two weeks for 92.5% of the frail patients, whereas it was about 73.6% of the pre-frail patients (P=0.016). On further follow-up, it was found that 37.1% of the frail patients died after 30 days of surgery whereas only 13.2% of the pre-frail patients died after 30 days of surgery (P=0.001).

Table 2: Comparative Outcomes of Hip Fracture Surgery in the Frail and the Pre-Frail Patients

S.N.	Outcome measures	Frail (54)	Pre-frail (38)	P-Value
1.	Peri-operative delirium	48 (88.8)	32 (84.5)	0.068
2.	Early ambulation (in 72 hours)	3 (5.5)	10 (26.3)	0.001
3.	Bed-sore (> Grade 2)	22 (39.8)	14 (36.8)	0.081
4.	Hospital acquired pneumonia	28 (51.8)	19 (50.0)	0.064
5.	Postural hypotension	50 (92.5)	34 (93.4)	0.051
6.	Urinary tract infection	38 (70.3)	18 (47.3)	0.001
7.	Deep vein thrombosis	28 (51.8)	12 (31.5)	0.003
8.	Pulmonary embolism	6 (11.1)	2 (5.26)	0.021
9.	Hospital stay (> 2 weeks)	50 (92.5)	28 (73.6)	0.006
10.	In-hospital mortality	22 (40.7)	12 (31.5)	0.011
11.	30- day mortality	20 (37.1)	5 (13.2)	0.001

DISCUSSIONS

The study was conducted among the elderly, patients with hip fracture. Perioperative complications like delirium were not significantly different, among the frail and the pre-frail patients. Pre-frail patients could be ambulated early, in comparison to their frail counterparts. The incidence of bedsores, postural hypotension and hospital acquired pneumonia was not significantly different among the frail and the pre-frail patients. But complications like urinary tract infection, deep vein thrombosis and pulmonary embolism were significantly higher among the frail patients. Similarly, hospital stay was longer in the frail group in comparison to the pre-frail ones. A significantly higher number of frail patients died, within their hospital stay. In addition to that, mortality at 30th day was significantly higher in the frail group. The findings of our study are similar to the study of hip fracture surgery, by Kistler E et.al, in which frailty was significantly associated with overall complications like delirium and increased length of hospital stay.⁽¹¹⁾ In another study by Krishnan M et.al, hip fracture patients with higher frailty index had a longer hospital stay and had a higher 30-day mortality.⁽¹²⁾ Thus, the overall outcomes of hip fracture surgery were significantly poorer in the frail group, in comparison to the pre-frail ones. So, prevention of frailty is an important aspect of active and healthy ageing.

CONFLICT OF INTEREST STATEMENT

The authors confirm that, there are no conflicts of interest.

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